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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/330,417

06/11/99

PAVELCHEK

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50369

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IM22/0924

EXAMINER

KORNAKOV, M

ART UNIT

PAPER NUMBER

1746

DATE MAILED:

09/24/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

**Office Action Summary**

Application No.

09/330,417

Applicant(s)

PAVELCHEK, EDWARD K.

Examiner

Michael Komakov

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period of Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 July 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 4-20 and 24-29 is/are pending in the application.
- 4a) Of the above claim(s) 26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 4-20 and 24-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

### DETAILED ACTION

1. The cancellation of claims 2, 3, 21-23 and introduction of claims 24-29 has been acknowledged in Applicant's amendment, dated July 09, 2001, Paper No. 10.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 4-17, 18, 19 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- The recited in claims 1 "mole percent of inorganic atoms, based on total solids of the antireflective composition" constitute an indefinite subject matter, because it is not clear as to what is meant by "mole percent of inorganic atoms". The term "inorganic atoms" is repugnant to the art recognized terms, the term "inorganic compounds" is appropriate, not inorganic atoms. The mole percentage of so called "inorganic atoms" is absolutely vague and indefinite, and the Examples presented by Applicant relate to different situation, either when the molar amounts of monomeric units in a polymer chain are calculated, as in U.S. Patent 5,340, 696, or when the molar amounts of each compound presented by the exact chemical formula is provided, as in U.S. 5,645,970. In the instant claim 1 the very term inorganic atoms is not determined, and the total molar amount of "solids" cannot be established.

The instant specification does not clearly provide the necessary information.

- The recited in claims 13, 18, 19 ratio of reactivity of antireflective hard mask layer and dielectric layer during "oxygen plasma oxygen" etching constitutes an indefinite subject matter, because first of all it is not clear what is the meaning of "oxygen plasma oxygen", and second, it is not clear why comparison of reactivity is for the **dielectric layer** and a hard mask layer, while the conditions of etching are set forth for hard mask composition and **antireflective composition**.

- The recited "bard areas" as per claims 1, 18 and 24 constitute an indefinite subject matter because the dictionary meaning of the word "bard" has nothing in common with photoresists and antireflective coatings.

3. Newly submitted claim 26 is directed to the species that is independent or distinct from the invention originally claimed for the following reasons: the election of species was made to prosecute claims directed to the Group IIIa metals.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 26 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

4. Claims 1, 4-11, 15-17 stand and claims 24, 25, 27-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Pavelchek et al. (U.S. 5,939,236), as per reasons clearly stated in the first Office Action on the merits.

Pavelchek provides methods for forming a photoresist relief image on substrates coated with antireflective compositions (hard masks) (col.5, lines 23-25) utilizing the following steps: providing dielectric substrate, such as silicone dioxide (col.14, line 34); depositing by spin coating (col. 14, line 27) a layer of antireflective composition on a substrate (col. 14 lines 27-29), the antireflective composition comprises photoacid generators which may employ halogen complex of divalent to heptavalent metals, for example Al (col.6, lines 46-48), which represents Group IIIa; depositing photoresist over the cured layer of antireflective coating (col. 14, lines 42-43); exposing photoresist to activating radiation (col. 14, lines 63-67) and developing photoresist (col. 15, line 23) to produce a patterned image over antireflective layer; etching areas, bared from photoresist, particularly, removing crosslinked antihalation (antireflective) coating layer by oxygen plasma etching and selectively processing bared substrate areas (col. 15, lines 36-42).

Pavelchek further discloses the use of aromatic polycyclic or heterocyclic compounds with optionally substituted anthracyl, phenanthryl, naphthyl and other groups (col. 7, lines 22-35) and wavelength exposure at 193 nm or 248 nm (col.4, line 62; Examples 3 and 4).

Pavelchek also teaches the use of a thermal acid generator as the part of antireflective composition (col. 11, lines 5-8).

Claims 13, 18 and 19 stand rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Pavelchek et al. (U.S.5,939,236). Due to the ambiguity of the amendment to claims 13, 18, 19, which

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has been reflected as the rejection under 35 USC 112, second paragraph, Examiner treated the above claims to the best of his understanding.

While teaching a method for forming a photoresist relief image on substrates coated with antireflective layers (hard masks), providing the steps identical to instantly claimed, Pavelchek does not specifically compare the reactivity of antireflective layer and the dielectric layer during the oxygen plasma etching. However, because Pavelchek teaches the use of antireflective hard masks and dielectric substrate, which are made in essentially the same manner as the ones instantly claimed, one skilled in the art would have expected the reactivity towards etching of applied layers during the oxygen plasma etching be the same as instantly claimed, consult *In re Fitzgerald* (205 USPQ 594). (CAFC).

Claims 12 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pavelchek et al (U.S. 5,939,236).

While disclosing the process and the antireflective hard mask composition utilized in this process as instantly claimed Pavelchek does not teach the use of plasma halide etching as per instant claims 12 and 20. However, Pavelchek himself provides a clear motivation for use any suitable plasma gas etch in his process (col. 15, line 40-41). Because the antireflective layer of Pavelchek contains aluminum, Examiner takes notice that the most appropriate environment for the plasma etching of aluminum layers should comprise chlorine containing gases. Therefore, it would have been found obvious by one skilled in the art at the time the invention was made to utilize chlorine

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containing plasma for the etching of antireflective layer of Pavelchek and thus to arrive at the claimed subject matter with the reasonable expectation of success.

### ***Response to Arguments***

5. Applicant's arguments filed July 09, 2001 have been fully considered but they are not persuasive. The crux of Applicant's argument appears to hinge on the disclosure of Pavelchek, allegedly containing "very small" amounts of PAG compounds, different than in the present claim 1.

With all due respect to Applicants opinion, Applicant's attention is drawn to the fact that NO amount or even NO PAG at all is claimed in the instant claim 1.

In regard to Applicant's argument that Pavelchek does not disclose a composition comprising inorganic element and chromophore groups, Applicant's attention is drawn to the use in the cited reference of aromatic polycyclic or heterocyclic compounds with optionally substituted anthracyl, phenanthryl, naphthyl and other groups (col. 7, lines 22-35) and wavelength exposure at 193 nm or 248 nm (col.4, line 62; Examples 3 and 4). See also col. 6, lines 43-55.

In regard to the argument about significant etch rate differences of the compositions, Applicants are firstly reminded that a process, not product is claimed and it is axiomatic that one who performs the steps of the known process must necessarily produce all of its advantages. Mere recitation of a newly discovered function or property, that is inherently possessed by things in the prior art does not cause a claim drawn to

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these things to distinguish over the prior art, consult *In Re Leinoff v. Louis Milona & Sons, Inc.* 220 USPQ 845 (CAFC 1984).

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (703) 305-0400. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (703) 308-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703)



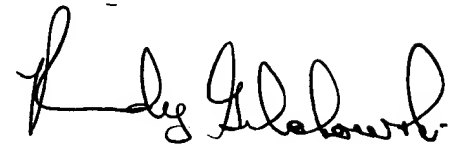
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305-3599 for regular communications and (703)305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 2450.

Michael Kornakov  
Examiner  
Art Unit 1746

MK.  
September 18, 2001

A handwritten signature in black ink, appearing to read "Randy Gulakowski". The signature is fluid and cursive, with the first name "Randy" and last name "Gulakowski" clearly distinguishable.

RANDY GULAKOWSKI  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700